

COLLECTIVE MOTION OF MICRO-ORGANISMS

Investigation of flow patterns induced by the collective motion of micro-organisms

Problem:

Dense suspensions of micro-organisms have been observed experimentally to display coordinated motion over length scales significantly larger than that of an individual cell. The emergence of such coherent structures is thought to be governed by the cell volume fraction as well as the details of the swimming mechanisms of the micro-organisms.

Project:

This project investigates flow structures emerging at the onset of collective motion of microorganisms. You will take advantage of a unique tomographic PIV experimental set up recently developed in the laboratory for Aero- and Hydrodynamic (Kim H. *et al.* 2011). This set up will allow you to visualize and investigate the 3D coherent flow structures created by the collective dynamics of micro-organisms and to characterize the enhancement of mixing and transport in the suspension.

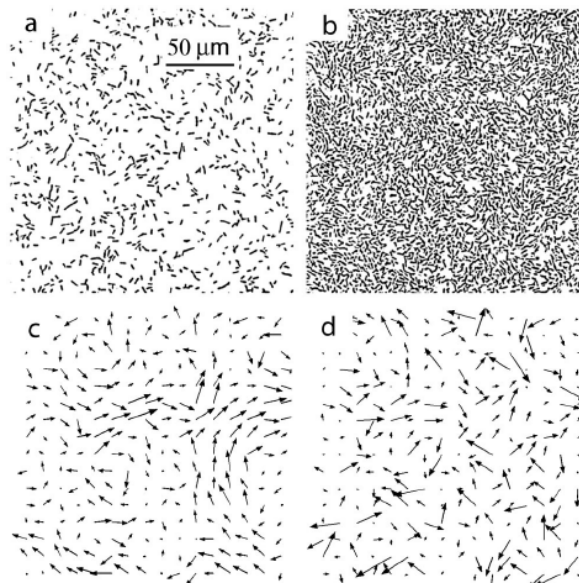


Figure 1: Bacteria patterns for low density 0:14, no collective swimming (a); high density 0:47, well-developed chaotic large-scale flows (b). Vector fields for velocity V (c) and orientation (d) for the configuration shown in image (b). Reproduced from Sokolov, Aranson, Kessler and Goldstein, *PRL* 98,158102 (2007)

This project can be used to finish your M.Sc.-study Mech.Eng. in “SFM”, “SPET” or “PME”. For more information you can contact Daniel TAM.

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